

Final

**Sampling and Analysis Plan/Quality Assurance Project Plan for
Activity-Based Outdoor Air Exposures, Operable Unit 8,
Libby Asbestos Superfund Site, Libby, Montana
2010 Sampling Events**

Prepared For:



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Environmental Response Team
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Prepared By:



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**Based on the Intergovernmental Data Quality Task Force
Uniform Federal Policy for Quality Assurance Project Plans
(EPA-505-B-04-900A)**

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QAPP Worksheet #1
Title and Approval Page

Site Name/Project Name: Activity-Based Outdoor Air Exposures, Operable Unit (OU) 8, Libby Asbestos Superfund Site

Site Location: Libby, Montana

Document Title: Final Sampling and Analysis Plan/Quality Assurance Project Plan (SAP/QAPP) for Activity-Based Outdoor Air Exposures, Operable Unit 8, Libby Asbestos Superfund Site

Lead Organization: United States Environmental Protection Agency (EPA)

Preparer's Name and Organizational Affiliation: Nikki MacDonald, (ES&T)

Preparer's Address, Telephone Number, and E-mail Address: 16194 W. 45th Drive, Golden, CO 80403
(303) 312-7054; macdonald.nikki@epa.gov

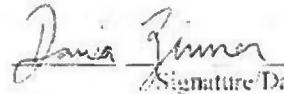
Preparation Date (Day/Month/Year): April 23, 2010

Investigative Organization's Project Manager/Date:

 11/30/11
Signature/Date

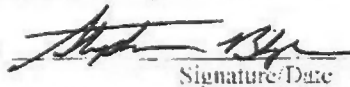
Printed Name/Organization: Joe Schaefer/EPA Environmental Response Team (ERT) Work Assignment Manager (WAM)

Investigative Organization's Project QA Officer/Date:

 11/28/11
Signature/Date

Printed Name/Organization: Dania Zinner Region 8 QA/QC Coordinator/EPA RPM


ERT Project QA Officer/Date:

 11/28/11
Signature/Date

Printed Name/Organization: Stephen Blaze ERT QA/QC Coordinator/EPA

The ERT Quality Coordinator's signature on this page constitutes approval of the Libby Region 8 QAPP for activities performed by SERAS. Activities conducted by SERAS are covered in the SERAS QAPP for Libby Asbestos dated 8/24/10 (SERAS-084-DQAPP-082410).

Lead Organization's Project Officer (PO)/Date:

 12/5/11
Signature/Date

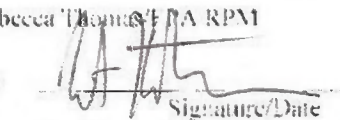
Printed Name/Organization: Martin McComb/EPA PO

Lead Organization's Remedial Project Manager (RPM)/Date:

 11/28/11
Signature/Date

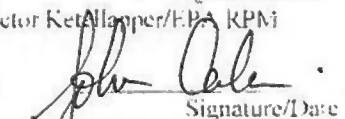
Printed Name/Organization: Rebecca Thomas/EPA RPM

Lead Organization's RPM/Date:

 12/5/11
Signature/Date

Printed Name/Organization: Victor Ketallapper/EPA RPM

Other Approval Signature/Date:

 11/30/11
Signature/Date

Printed Name/Title: John Calanni/ES&T Team Manager

QAPP Worksheet #2 QAPP Identifying Information

Site Name/Project Name: Activity-Based Outdoor Air Exposures, OU 8, Libby Asbestos Superfund Site
Site Location: Libby, Montana
Site Number/Code: 08BC
Operable Unit: OU8
Contractor Names: TechLaw, Inc.
Lockheed Martin
Contractor Number: EP-W-06-033 (TechLaw, Inc.)
EP-W-09-031 (Lockheed Martin)
Contract Title: ESAT (TechLaw, Inc.)
SERAS (Lockheed Martin)
Work Assignment Number: MM-102 (ESAT)
SER00084 (SERAS)

1. Identify regulatory program: Comprehensive Environmental Response, Compensation, Liability Act of 1980 (CERCLA)
2. Identify approval entity: ERT and EPA Region VIII
3. The QAPP is (select one): ☐ Generic ☒ Project Specific
4. List dates of scoping sessions that were held: 04/23/2010
5. List dates and titles of QAPP documents written for previous site work, if applicable:

Title
Approval Date

6. List organizational partners (stakeholders) and connection with lead organization:
ERT
Montana Department of Transportation (MDOT)
Montana Department of Environmental Quality (MDEQ)
7. List data users:
EPA Region VIII
MDEQ
MDOT
8. If any required QAPP elements and required information are not applicable to the project, provide an explanation for their exclusions below:
Worksheet #25 - Responsibility of the EPA Region VIII Contrated Laboratory (ESAT or subcontract laboratory determined by ESAT), Worksheet #28 – Information provided in Worksheet #12, Worksheet #37 - Responsibility of EPA Region VIII

QAPP Worksheet #2
QAPP Identifying Information
(continued)

Required QAPP Element(s) and Corresponding QAPP Section(s)	Required Information	QAPP Worksheet #
Project Management and Objectives		
2.1 Title and Approval Page	- Title and Approval Page	1
2.2 Document Format and Table of Contents 2.2.1 Document Control Format 2.2.2 Document Control Numbering System 2.2.3 Table of Contents 2.2.4 QAPP Identifying Information	- Table of Contents - QAPP Identifying Information	2
2.3 Distribution List and Project Personnel Sign-Off Sheet 2.3.1 Distribution List 2.3.2 Project Personnel Sign-Off Sheet	- Distribution List - Project Personnel Sign-Off Sheet	3 4
2.4 Project Organization 2.4.1 Project Organizational Chart 2.4.2 Communication Pathways 2.4.3 Personnel Responsibilities and Qualifications 2.4.4 Special Training Requirements and Certification	- Project Organizational Chart - Communication Pathways - Personnel Responsibilities and Qualifications Table - Special Personnel Training Requirements Table	5 6 7 8
2.5 Project Planning/Problem Definition 2.5.1 Project Planning (Scoping) 2.5.2 Problem Definition, Site History, and Background	- Project Planning Session Documentation (including Data Needs tables) - Project Scoping Session Participants Sheet - Problem Definition, Site History, and Background - Site Maps (historical and present)	N/A 9 10 Attachment A Attachment B
2.6 Project Quality Objectives and Measurement Performance Criteria 2.6.1 Development of Project Quality Objectives Using the Systematic Planning Process 2.6.2 Measurement Performance Criteria	- Site-Specific PQOs - SAP Analytical Summary Sheet OU8ABS0710	11 12

QAPP Worksheet #2
QAPP Identifying Information
(continued)

Required QAPP Element(s) and Corresponding QAPP Section(s)	Required Information	QAPP Worksheet #
2.7 Secondary Data Evaluation	<ul style="list-style-type: none"> - Sources of Secondary Data and Information - Secondary Data Criteria and Limitations Table 	13
2.8 Project Overview and Schedule	- Summary of Project Tasks	14
2.8.1 Project Overview	- Reference Limits and Evaluation Table	15
2.8.2 Project Schedule	- Project Schedule/Timeline Table	16
Measurement/Data Acquisition		
3.1 Sampling Tasks	- Sampling Design and Rationale	17
3.1.1 Sampling Process Design and Rationale	- Sample Location Map (Ambient air samples only)	Attachment B
3.1.2 Sampling Procedures and Requirements	- Sampling Locations and Methods/SOP Requirements Table	18
3.1.2.1 Sampling Collection Procedures	- Analytical Methods/SOP Requirements Table	19
3.1.2.2 Sample Containers, Volume, and Preservation	- Field Quality Control Sample Summary Table	20
3.1.2.3 Equipment/Sample Containers Cleaning and Decontamination Procedures	- Sampling SOPs	21
3.1.2.3 Field Equipment Calibration, Maintenance, Testing, and Inspection Procedures	- Project Sampling SOP References Table	22
3.1.2.4 Supply Inspection and Acceptance Procedures	- Field Equipment Calibration, Maintenance, Testing, and Inspection Table	
3.1.2.6 Field Documentation Procedures		
3.2 Analytical Tasks	- Analytical SOPs	23
3.2.1 Analytical SOPs	- Analytical SOP References Table	24
3.2.2 Analytical Instrument Calibration Procedures	- Analytical Instrument Calibration Table	N/A
3.2.3 Analytical Instrument and Equipment Maintenance, Testing, and Inspection Procedures	- Analytical Instrument and Equipment Maintenance, Testing, and Inspection Table	
3.2.4 Analytical Supply Inspection and Acceptance Procedures		

QAPP Worksheet #2
QAPP Identifying Information
(continued)

Required QAPP Element(s) and Corresponding QAPP Section(s)	Required Information	QAPP Worksheet #
3.3 Sample Collection Documentation, Handling, Tracking, and Custody Procedures 3.3.1 Sample Collection Documentation 3.3.2 Sample Handling and Tracking System 3.3.3 Sample Custody	<ul style="list-style-type: none"> - Sample Collection Documentation Handling, Tracking, and Custody SOPs - Sample Container Identification - Sample Handling Flow Diagram - Example Chain-of-Custody Form and Seal 	26 27
3.4 Quality Control Samples 3.4.1 Sampling Quality Control Samples 3.4.2 Analytical Quality Control Samples	<ul style="list-style-type: none"> - QC Samples Table - Screening/Confirmatory Analysis Decision Tree 	N/A
3.5 Data Management Tasks 3.5.1 Project Documentation and Records 3.5.2 Data Package Deliverables 3.5.3 Data Reporting Formats 3.5.4 Data Handling and Management 3.5.5 Data Tracking and Control	<ul style="list-style-type: none"> - Project Documents and Records Table - Analytical Services Table - Data Management SOPs 	29 30
Assessment/Oversight		
4.1 Assessments and Response Actions 4.1.1 Planned Assessments 4.1.2 Assessment Findings and Corrective Action Responses	<ul style="list-style-type: none"> - Assessments and Response Actions - Planned Project Assessments Table - Audit Checklists - Assessment Findings and Corrective Action Responses Table 	31 N/A 32
4.2 QA Management Reports	<ul style="list-style-type: none"> - QA Management Reports Table 	33
4.3 Final Project Report		

QAPP Worksheet #2
QAPP Identifying Information
(continued)

Required QAPP Element(s) and Corresponding QAPP Section(s)	Required Information	QAPP Worksheet #
Data Review		
5.1 Overview		
5.2 Data Review Steps	- Verification (Step I) Process Table	34
5.2.1 Step I: Verification		
5.2.2 Step II: Validation	- Validation (Steps IIa and IIb) Process Table	35
5.2.2.1 Step IIa Validation Activities		
5.2.2.2 Step IIb Validation Activities	- Validation (Steps IIa and IIb) Summary Table	36
5.2.3 Step III: Usability Assessment		
5.2.3.1 Data Limitations and Actions from Usability Assessment	- Usability Assessment	N/A
5.2.3.2 Activities		
5.3 Streamlining Data Review		
5.3.1 Data Review Steps To Be Streamlined		
5.3.2 Criteria for Streamlining Data Review		
5.3.3 Amounts and Types of Data Appropriate for Streamlining		

QAPP Worksheet #3
Distribution List

QAPP Recipients	Title	Organization	Phone Number	E-mail Address	Number of Copies
Martin McComb	PO	EPA	(303) 312-6963	mccomb.martin@epa.gov	1
Rebecca Thomas	RPM	EPA	(303) 312-6552	thomas.rebecca@epa.gov	1
Victor Ketellapper	RPM	EPA	(303) 312-6578	ketellapper.victor@epa.gov	1
David Berry	Toxicologist	EPA	(303) 312-6358	berry.david@epa.gov	1
Michael Cirian	RPM/Field Lead	EPA	(406) 293-6194	cirian.mike@epa.gov	1
Brian Goodman	Environmental Services	MDOT	(406) 444-7632	bgoodman@mt.gov	1
Philip Campagna	WAM	ERT	(732) 321-6689	campagna.philip@epa.gov	1
Stephen Blaze	QA/QC Coordinator	ERT	(732) 906-6921	blaze.stephen@epa.gov	1
Joe Schaefer	Alternate WAM	ERT	(732) 906-6920	schaefer.joe@epa.gov	1
Philip Solinski	Air/Response Chemist	SERAS	(732) 321-4283	philip.j.solinski@lmco.com	1
John Calanni	Team Manager	ESAT	(303) 312-7720	calanni.john@epa.gov	1
Nikki MacDonald	QA/QC Coordinator	ESAT	(303) 312-7054	macdonald.nikki@epa.gov	1
Catherine LeCours	RPM	MDEQ	(406) 841-5040	clecours@mt.gov	1
Mike Noble	Representative	Libby Area Technical Advisory Group	(406) 293-3539	mcnoble@hotmail.com	1

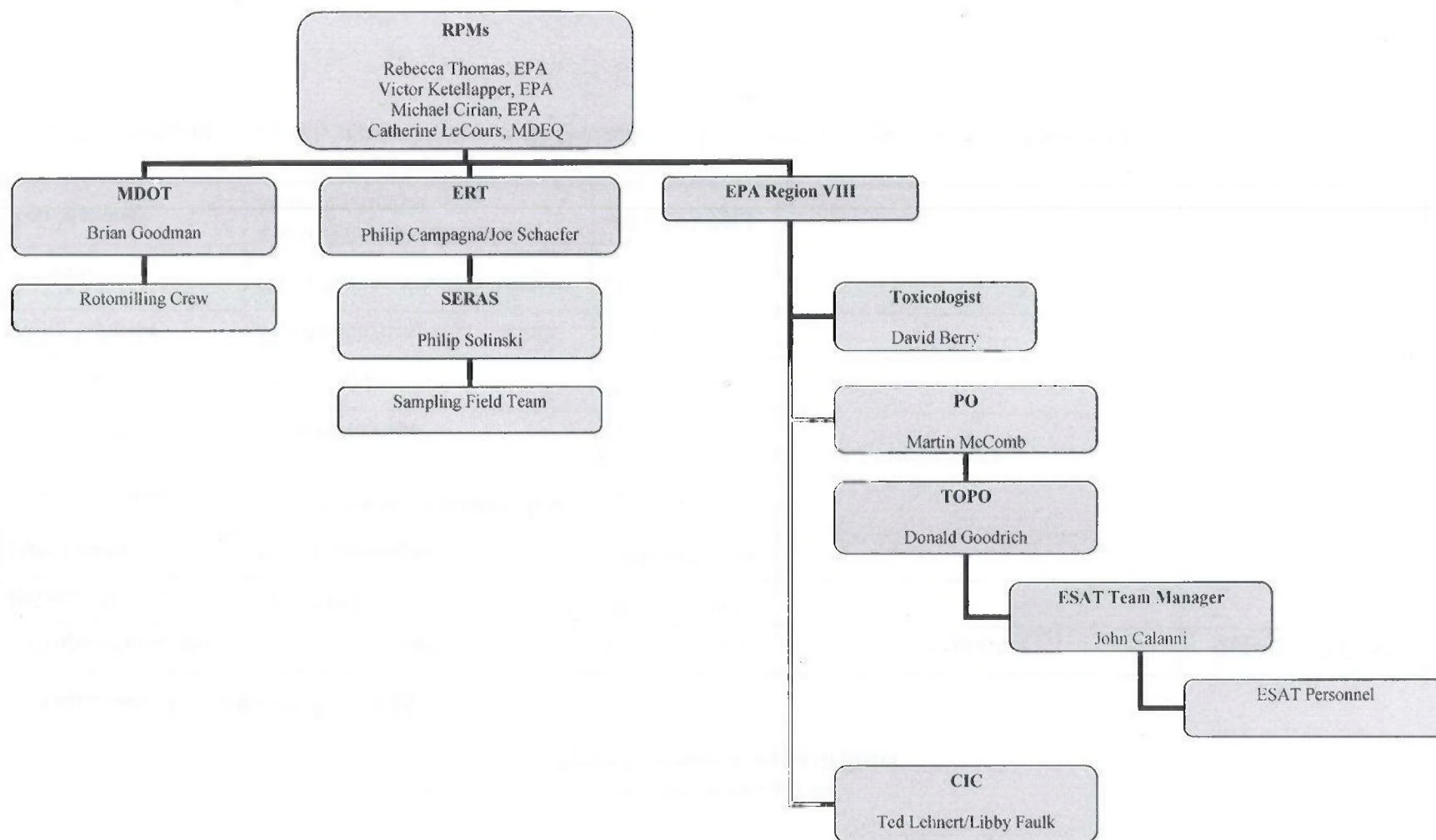
**QAPP Worksheet #4
Project Personnel Sign-Off Sheet**

Organization: EPA/ERT/ESAT/SERAS

Project Personnel	Title	Phone Number	Signature	Date QAPP Read
Rebecca Thomas	EPA RPM	(303) 312-6552		
David Berry	EPA Toxicologist	(303) 312-6358		
Donald Goodrich	EPA Task Order Project Officer (TOPO)	(303) 312-6687		
Michael Cirian	RPM/Field Lead	(406) 293-6194		
Philip Campagna	ERT WAM	(732) 321-6689		
Philip Solinski	SERAS Air/Response Chemist	(732) 321-4283		
Douglas Kent	ESAT Senior Asbestos Analyst	(303) 312-7725		
Ron Mahoney	EMSL/Libby Asbestos Lab Manager/Analyst	(406) 293-9066		

Note: Project personnel are only required to review the Worksheets relevant to their scope of work for this project.

QAPP Worksheet #5
Project Organizational Chart



QAPP Worksheet #6
Communication Pathways

Communication Drivers	Responsible Entity	Name	Phone Number	Procedure (Timing, Pathways, etc.)
Approval of initial SAP/QAPP and any amendments	EPA PO EPA RPM EPA RPM EPA RPM/Field Lead ERT WAM ERT QA/QC Coordinator SERAS Air/Response Chemist ESAT Team Manager	Martin McComb Rebecca Thomas Victor Ketellapper Michael Cirian Joe Schaefer Stephen Blaze John Calanni	(303) 312-6963 (303) 312-6552 (303) 312-6578 (406) 293-6194 (732) 321-6689 (732) 906-6921 (732) 321-4283 (303) 312-7720	ESAT internal peer review followed by EPA and ERT approval. Implementation of changes effective only with approved SAP/QAPP or QAPP Change Form.
Initiation, notification, and/or approval of real-time modifications	EPA RPM EPA RPM/Field Lead ERT WAM	Rebecca Thomas Michael Cirian Philip Campagna	(303) 312-6552 (406) 293-6194 (732) 321-6689	Implementation of real-time modifications will be determined in the field by the ERT WAM and approved by an EPA RPM. Verbal or electronic modifications may be necessary for time-sensitive issues; however, all modifications must be documented in writing, approved by an EPA RPM and ERT WAM, and retained with the Final SAP/QAPP.
Reporting issues related to analytical data quality, including, but not limited to, ability to meet reporting limits	ESAT Team Manager ESAT QA/QC Coordinator ESAT Senior Asbestos Analyst	John Calanni Nikki MacDonald Douglas Kent	(303) 312-7720 (303) 312-7054 (303) 312-7725	Describes issues to PO and initiates Corrective Action.
Non-conformance and Corrective Action for Analytical Data Quality	EPA PO ERT WAM ESAT QA/QC Coordinator	Martin McComb Joe Schaefer Nikki MacDonald	(303) 312-6963 (732) 321-6689 (303) 312-7054	Corrective Actions and any modifications to the Final SAP/QAPP must be documented in writing, approved by the EPA PO, and retained with the Final SAP/QAPP.
Posting of Deliverables to Scribe.net and OSC.net	EPA PO SERAS Air/Response Chemist ESAT John Calanni ESAT Data Manager	Martin McComb Philip Solinski John Calanni Amy Christensen	(303) 312-6963 (732) 321-4283 (303) 312-7720 (303) 312-7724	Modes of delivery include electronic delivery of all related documents, data upload to the Scribe.net Database, data upload to OSC.net (real-time data website), and notifying the EPA Region VIII Toxicologist (David Berry) when data is available.
Work Assignment	EPA PO EPA RPM ERT WAM	Martin McComb Rebecca Thomas Joe Schaefer	(303) 312-6963 (303) 312-6552 (732) 321-6689	Describes scope of work to ERT and ESAT personnel from the ERT WAM.
On-Site Health and Safety Meeting	On-Site Health and Safety Officer (HSO)	Joe Schaefer	(732) 321-6689	Describe potential site hazards, required personal protective equipment, and access to local emergency services.

QAPP Worksheet #7
Personnel Responsibilities and Qualification Table

Name	Title	Organizational Affiliation	Responsibilities	Education and Experience Qualifications
Martin McComb	PO	EPA	Lead Organization Project Supervision and Task Direction	EPA job-related qualifications/EPA files
Rebecca Thomas	RPM	EPA	Lead Organization Project Oversight and Decision Making	EPA job-related qualifications/EPA files
Victor Ketellapper Michael Cirian	RPM RPM/Field Lead	EPA	Project Support	EPA job-related qualifications/EPA files
David Berry	Toxicologist	EPA	Risk Assessment	EPA job-related qualifications/EPA files
Joe Schaefer	WAM	ERT	Technical Direction/Project Oversight and On-Site Health and Safety Operations and Oversight	EPA job-related qualifications/EPA files
Dania Zinner	QA/QC Coordinator	Region 8	Project QA/QC	EPA job-related qualifications/EPA files
Stephen Blaze	QA/QC Coordinator	ERT	SERAS QA Oversight	EPA job-related qualifications/EPA files
Philip Solinski	Air/Response Chemist	SERAS	Sampling Operations Oversight	Minimum B.S. degree plus 14 years related experience/Lockheed Martin
John Calanni	Team Manager	ESAT	Technical Direction	Minimum M.S. degree plus 15 years related experience/TechLaw, Inc. files
Nikki MacDonald	QA/QC Coordinator	ESAT	ESAT QA/QC Oversight/Deliverable Review	Minimum B.S. degree plus 6 years related experience/TechLaw, Inc. files
Amy Christensen	Data Manager	ESAT	Data Validation and Upload	Job-related qualifications/TechLaw, Inc. files
Douglas Kent	Lead Asbestos Analyst	ESAT	Asbestos Technical Expert/Preparation and Review of Analytical Report	Minimum B.S. degree plus 16 years related experience/TechLaw, Inc. files

**QAPP Worksheet #8
Special Personnel Training Requirements Table**

Project Function	Specialized Training – Title or Description of Course	Training Provider	Training Date	Personnel/Groups Receiving Training	Personnel Titles/ Organizational Affiliation	Location of Training Records/Certificates
Project Oversight	Read and understand site-specific Health & Safety Plan (HASP) and all relevant documents Attend orientation with on-site HSO OSHA 40-Hour HAZWOPER and relevant 8-Hour Refresher Current medical clearance including respirator fit test	EPA/ERT On-site HSO	Annual	Field Team	EPA/ERT/SERAS	SERAS Health and Safety Files
Asbestos Air Sampling	Read and understand site-specific HASP and all relevant documents Attend orientation with on-site HSO OSHA 40-Hour HAZWOPER and relevant 8-Hour Refresher Current medical clearance including respirator fit test	EPA/ERT On-site HSO	Annual	Field Team	SERAS	SERAS Health and Safety Files
Particulate Monitoring	Read and understand site-specific HASP and all relevant documents Attend orientation with on-site HSO OSHA 40-Hour HAZWOPER and relevant 8-Hour Refresher Current medical clearance including respirator fit test	EPA/ERT On-site HSO	Annual	Field Team	SERAS	SERAS Health and Safety Files
On-Site Health & Safety Operations and Oversight	Read and understand site-specific HASP and all relevant documents OSHA 40-Hour HAZWOPER and relevant 8-Hour Refresher Current medical clearance including respirator fit test	SERAS	Annual	On-Site HSO	SERAS	SERAS Health and Safety Files

QAPP Worksheet #9
Project Scoping Session Participants Sheet

Project Name: Activity-Based Outdoor Air Exposures Projected Date(s) of Sampling: July and August 2010 Project Manager: Martin McComb			Site Name: OU8, Libby Asbestos Superfund Site Site Location: Libby, Montana		
Date of Session: 04/23/2010 Scoping Session Purpose: Development of study design and project objectives					
Name	Title	Affiliation	Phone #	E-mail Address	Project Role
Martin McComb	PO	EPA	(303) 312-6963	mccomb.martin@epa.gov	Lead Organization PO
Rebecca Thomas	RPM	EPA	(303) 312-6552	thomas.rebecca@epa.gov	Lead Organization RPM
David Berry	Toxicologist	EPA	(303) 312-6358	berry.david@epa.gov	Lead Organization Risk Assessment
Philip Campagna	WAM	ERT	(732) 321-6689	campagna.philip@epa.gov	Investigative Organization WAM
Philip Solinski	Air/Response Chemist	SERAS	(732) 321-4283	philip.j.solinski@lmco.com	Sampling Operations
Nikki MacDonald	QA/QC Coordinator	ESAT	(303) 312-7054	macdonald.nikki@epa.gov	SAP/QAPP Preparer

Comments: The MDOT rotomilling and asphalt work on both sidewalks and roadways along Highway 37 between Highway 2 and the bridge over the Kootenai River in Libby, Montana is scheduled to begin in July 2010. This QAPP will be used to support an activity based sampling (ABS) and monitoring effort that will run in conjunction with the MDOT rotomilling work. This QAPP describes the collection of data needed to characterize exposures of site workers and Libby residents to asbestos during the rotomilling activities. In addition to the rotomilling work, MDOT is concerned about potential asbestos contamination along several miles of roadways in OU8. The roadways include Highway 37 between Rainy Creek Road and the dam, Highway 2, and secondary Highways 260, 482, and 567. This QAPP will be used to support soil sample collection along the five highway segments, followed by ABS sampling, in order to characterize the level of asbestos contamination in these areas. Soil sample collection is scheduled to begin July 20, 2010 prior to the rotomilling work. This document contains all the elements required for the SAP/QAPP and was developed in accordance with the Uniform Federal Policy for Quality Assurance Project Plans (EPA-505-B-04-900A).

Action Items: Participants of this project scoping session discussed and clarified the following: objectives and scope of the fieldwork; equipment and training needs; field operating procedures, schedules of events, and individual assignments; required QA/QC measures; health and safety requirements; documents governing fieldwork that must be on-site; and any changes in the field planning documents. ESAT

QAPP Worksheet #9
Project Scoping Session Participants Sheet
(continued)

incorporated all additional information and decisions made during this scoping session into the Final SAP/QAPP.

Consensus Decisions for the Highway Segment Work: A member of the field crew will be used to visually spot vermiculite along the highway segments. Composite soil samples will be collected from areas with the highest concentration of visible vermiculite. The number of aliquots that will make up one composite sample and the number of composite samples to be collected was determined. The exact locations of ABS sampling will be determined in the field based on the results of the composite soil samples. ABS samples will also be collected from lawn mowing equipment while MDEQ mows along Highway 37.

Consensus Decisions for the Rotomilling Work: The number of low and high volume perimeter air samples to be collected was determined. The number of collection stations for ambient air samples was determined; however, the exact locations of the collection stations will be determined in the field. Additional samples may be collected based on the duration of the rotomilling activities and the amount of time unpaved road surfaces will be exposed.

QAPP Worksheet #10
Problem Definition

The problem to be addressed by the project: As determined by previous investigations conducted at the Libby Asbestos Superfund Site, Libby Amphibole asbestos (LA) is present in multiple environmental media in Libby (indoor and outdoor air, vermiculite insulation, and soils). MDOT is concerned about the level of asbestos contamination in outdoor air, if any, encountered during routine maintenance activities along highway Right of Ways (ROWs). Maintenance activities may include lawn mowing, road sweeping, ditch cleaning, and brush cutting. During 2006 and 2007, Tetra Tech, Inc. collected soil and air samples during routine maintenance activities, and LA was detected in some of these samples. In March 2010, ESAT personnel analyzed five asphalt core samples for asbestos by polarized light microscopy (PLM). These core samples were taken from California Street and Highway 2 in Libby. In one of the core samples, trace (0.1%) LA was detected indicating that LA may also be embedded in the roads in and around Libby. MDOT will begin conducting rotomilling and asphalt work in July 2010. The airborne dust generated from these road construction activities, as well as routine maintenance activities, may potentially be contaminated with LA; therefore, persons performing the rotomilling and maintenance work and the residents of Libby may be exposed to LA, which may pose a risk of cancer and/or non-cancer effects. Note that other amphibole asbestos and chrysotile asbestos may also be encountered during the analysis of air samples, which is most likely the result of the brake lines used in commercial trucks.

ERT/SERAS personnel will be conducting all data monitoring and sampling activities. ERT will provide persons who are trained to visibly detect vermiculite in soils. SERAS personnel will collect soil aliquot samples at locations based on the results of the visible vermiculite detection; the soil aliquots will be used to create composite samples. The exact location (latitude and longitude data) of each soil aliquot collected will be recorded on-site using a global positioning system (GPS) unit. ABS samples will be collected along the five highway segments based on the results of the soil samples. Air samplers will be placed on mowers while MDEQ mows the ROWs along Highway 37. SERAS personnel will set up DataRAMs for real-time data collection and monitoring of airborne dust emissions during rotomilling activities. Meteorological (MET) data (ambient temperature, relative humidity, wind speed and direction, and station pressure readings) will be collected by SERAS personnel using a portable 3-meter tower, and data will be stored in 5-minute averages. Perimeter samplers will be set up both upwind and downwind of the rotomilling activities, as well as an ABS sample on the rotomilling equipment. The exact locations of the perimeter air samplers will be determined in the field on the day of the sample collection, and will be based on MET data and traffic patterns. Exact locations of perimeter air samples will be recorded on-site using a GPS unit. Ambient air samplers will be set up at locations along Highway 37 during the entire duration of the rotomilling activities and while unpaved and/or unfinished sidewalk and road surfaces are exposed. The exact locations of the ambient air samplers will be recorded on-site using a GPS unit. All soil and air samples will be analyzed for asbestos by ESAT, or a subcontract laboratory determined by ESAT, on a rapid turn-around time.

The environmental questions being asked: Is dust contaminated with LA being generated during routine maintenance activities along highway ROWs? The rotomiller sprays water over the immediate area while it is in operation; however, as the back end dries and sidewalks and roads are not yet resurfaced, is there a need for additional dust suppression? Are rotomilling activities impacting ambient air quality? Note that MDOT is responsible for clean-up of any dust generated from the rotomilling activities.

Observations from any site reconnaissance reports: N/A

QAPP Worksheet #10
Problem Definition
(continued)

A synopsis of secondary data or information from site reports: The analytical results of the soil and air samples collected by Tetra Tech, Inc. in 2006 and 2007 indicate that routine maintenance activities along highway ROWs could generate dust that is potentially contaminated with LA. The analytical results from the March 2010 asphalt core sample study indicate that the MDOT rotomilling and asphalt work could also generate dust that is potentially contaminated with LA.

The possible classes of contaminants and the affected matrices: Asbestos contamination impacting air quality.

The rationale for inclusion of chemical and nonchemical analyses: Known asbestos contamination.

Information concerning various environmental indicators: N/A

Project decision conditions ("If..., then..." statements): If visible vermiculite is observed in the soil during soil sample collection, then level D personal protective equipment (PPE) will be upgraded to half-face respirators equipped with P100 filters. If no visible vermiculite is observed in the soil, then level D PPE is appropriate. If DataRAM total particulate concentrations exceed 100 micrograms per cubic meter (or a different number determined by the field crew based on field conditions) above background for two consecutive 15-minute averages, then more effective dust suppression activities will be required during rotomilling activities until the cessation of activities. If analytical results for asbestos in air samples exceed 5.5 fibers/100 microscopic fields of view (FOV) using phase contrast microscopy (PCM) NIOSH Method 7400, then samples will be analyzed by transmission electron microscopy (TEM) ISO Methods 10312 or 13794 to verify the presence of asbestos. If analytical results for asbestos in air samples by PCM are negative, then ten percent of the air samples will be analyzed by the TEM ISO Methods listed above. The ten percent of air samples to be analyzed by TEM will be selected based on the highest readings by PCM, even though PCM results may be less than 5.5 fibers/100 FOV. All air samples will be taken to the EMSL/Libby laboratory in Libby, MT for a determination of cassette filter loading.

QAPP Worksheet #11
Project Quality Objectives /Systematic Planning Process Statements

Who will use the data? EPA Region VIII, MDOT and MDEQ
What will the data be used for? Data will be used to evaluate the potential health risks to site workers and Libby residents who may be exposed to LA, other amphibole asbestos, and chrysotile asbestos in outdoor air during routine maintenance and constructions work in OU8.
What type of data are needed? (target analytes, analytical groups, field screening, on-site analytical or off-site laboratory techniques, sampling techniques) Particulate air monitoring data using DataRAMs; ABS, perimeter and ambient air sampling data for asbestos using NIOSH 7400, <i>Asbestos and Other Fibers by PCM</i> , TEM-ISO 10312, <i>Asbestos in Ambient Air by TEM, Direct Prep</i> , and TEM-ISO 13794, <i>Asbestos in Ambient Air by TEM, Indirect Prep</i> ; soil sampling data for asbestos using NIOSH 9002, <i>Asbestos (bulk) by PLM</i> , and EPA 600/R-93/116, <i>Method for the Determination of Asbestos in Bulk Building Materials</i> .
<p>How “good” do the data need to be in order to support the environmental decision? Asbestos data must meet definitive and screening data requirements according to the Libby Site. For each sample collected, samplers must fill out a sample log sheet which will be provided by CDM. DataRAM and MET data must meet the following data requirements:</p> <ol style="list-style-type: none"> 1. Monitoring documentation in the form of field logbooks and appropriate field data sheets. 2. All instrument calibration and/or performance check procedures/methods will be summarized and documented in the appropriate field, personal, or instrument log notebook. Refer to the manufacturer's instructions or the appropriate Standard Operating Procure (SOP) for specific procedures and frequency for calibration during use. 3. Reporting limits (RLs) will be determined and documented along with the data, where appropriate. <p>All equipment used will undergo a wet decon between each sampling station.</p>

QAPP Worksheet #11
Project Quality Objectives /Systematic Planning Process Statements
(continued)

How much data are needed (number of samples for each analytical group, matrix, and concentration)?

Soil Samples Soil samples will be collected along both sides of selected ROWs from the following roadways in OU8: Highway 37 from Rainy Creek Road to the dam, Highway 2, Highway 260, Highway 482, and Highway 567. One soil aliquot will be collected for every 100 feet (ft) of ROW. The aliquots will be pulled from areas with visible vermiculite. A composite sample will be created out of ten aliquots; therefore, one composite sample will be created for every 1,000 ft of ROW. The volume of soil required for each aliquot should be approximately 100 grams (g) in order to make a composite sample of approximately one kilogram (kg). A total of approximately 250 composite samples will be created.

ABS Samples ABS samples will be collected from approximately six locations along the above listed highways pending the results of the soil samples. Samples will be collected using a minimum of two all-terrain vehicles (ATVs) at each location (one rider followed by at least one other rider). ATV riders will each be equipped with a low-flow (2-3 Liters/minute (L/min)) personal air sampler. Air cassettes will be changed at a set time determined on-site by the field crew. A minimum of 12 ABS air samples will be collected. MDEQ is also expected to mow areas along Highway 37. One high flow (10 L/min) and one low flow (2-3 L/min) air sampler will be set up daily on each mower during the duration of the mowing activities, and air sample cassettes will be changed every two hours or as determined on-site by the field crew. Representative soil samples will also be collected from each mowing area prior to the start of mowing activities. The exact number of air and soil samples collected during mowing activities will be determined on-site by the field crew.

Rotomilling Samples Four DataRAMs for real-time particulate monitoring will be set up each day of rotomilling activities. MET data will be collected at the start of each work day, or more frequently if necessary. A minimum of ten perimeter air samplers (five high flow (10 L/min) and five low flow (2-3 L/min)) will be set up daily, which includes one high flow and one low flow sampler on the rotomilling equipment. Perimeter air sample cassettes will be changed every two hours or as determined on-site by the field crew. Therefore, approximately 40 perimeter air samples will be collected per day of rotomilling activities. Additionally, a minimum of eight to ten ambient air samplers will be set up each day during the duration of the MDOT rotomilling and asphalt project. All ambient air samplers will be set at a high flow rate (10 L/min) for an 8 to 12-hour period. Therefore, one ambient air sample per day will be collected at each sampler station for a minimum total of eight samples collected per day.

Where, when, and how should the data be collected/generated? DataRAMs will be used according to the manufacturer's instructions. MET data will be collected according to SERAS SOP #2129, *Met One Remote Meteorological Station*. Perimeter and ambient air samples will be collected daily according to SERAS SOP #2015, *Field Sampling for Air Asbestos*. Locations of the perimeter and ambient air samples will be determined in the field on the day of the sample collection, and will be based on MET data and traffic patterns. The locations of soil aliquot samples along the highway ROWs will be determined based on visible vermiculite detection, and the ABS sample locations along the highway ROWs will be determined based on the results of the soil samples and collected according to SERAS SOP #2015, *Field Sampling for Air Asbestos*.

Who will collect and generate the data? ERT/SERAS will collect and generate all field data (DataRAM and MET data; soil samples; and ABS, perimeter and ambient air samples). ESAT, or a subcontract laboratory determined by ESAT, will generate all analytical data.

QAPP Worksheet #11
Project Quality Objectives /Systematic Planning Process Statements
(continued)

How will the data be reported? Real-time DataRAM and MET data will be posted daily to a secure internet site and uploaded into the Scribe database by ERT/SERAS. Asbestos analytical data (soil and air) will be reported by the analytical laboratory in the form of an electronic data deliverable (EDD) and a pdf of the Data Report via email. All asbestos analytical data is uploaded into the Scribe database by the ESAT Data Manager.

How will the data be archived? Hard copies of all monitoring data and analytical data will be given to the EPA PO, or his/her designate. Electronic copies of all monitoring data and analytical data will be archived in the Scribe database. Electronic copies of all analytical data will be archived on the ESAT network drive and backed up nightly on an external hard drive by the ESAT Data Manager.

QAPP Worksheet #12
SAP Analytical Summary # OU8ABS0710
Summary of Preparation and Analytical Requirements for Asbestos

Title: Final Sampling and Analysis Plan/Quality Assurance Project Plan for Activity-Based Outdoor Air Exposures, Operable Unit 8, Libby Asbestos Superfund Site

SAP Date (Revision): July 15, 2010

EPA Technical Advisor: Martin McComb (303-312-6963, mccomb.martin@epa.gov)
(contact to advise on DQOs of SAP related to preparation/analytical requirements)

Sampling Program Overview: The collection and analysis of soil, ABS, perimeter air, and ambient air samples during routine maintenance and road construction work in order to characterize outdoor air exposures of site workers and Libby residents to LA, other amphibole asbestos, and chrysotile asbestos.

Sample ID Prefix: Unknown

PLM Preparation and Analytical Requirements for Field Samples:

Medium Code	Sample Type	Preparation Method	Analysis Method	Applicable Laboratory Modifications
A	Soil (unprocessed) Includes field duplicates and field blanks	None (representative sample aliquot may be oven dried as needed)	PLM-9002	None
B	Soil (processed) Includes field duplicates, field blanks, and prep blanks	ISSI-LIBBY-01 (Rev. 10)	SRC-LIBBY-01 (Rev. 2) SRC-LIBBY-03 (Rev. 2)	Current versions of: LB-000072, LB-000073, LB-000086

Laboratory Quality Control (QC) Sample Frequencies: PLM Lab Duplicate Cross-Check – 8%
PLM Lab Duplicate Self-Check – 2%

QAPP Worksheet #12
SAP Analytical Summary # OU8ABS0710
Summary of Preparation and Analytical Requirements for Asbestos
(continued)

Medium-Specific TEM/PCM Preparation and Analytical Requirements for Field Samples:

Medium-Specific TEM/PCM Preparation and Analytical Requirements for Field Samples									
Medium Code	Sample Type	Investigative? (a)	Preparation Details			Analysis Details			Applicable Laboratory Modifications
			Indirect Prep? (a,b)		Filter Archive ? (b)	Method(s)	Recording Rules	Analytical Sensitivity/ Prioritized Stopping Rules	
			With Ashing (b)	Without Ashing (b)					
C	Outdoor ABS Samples (ATV, and mowing and roto-milling equipment), Perimeter Air Samples, Ambient Air Samples (includes field duplicates)	Yes	No	No	Yes	PCM – NIOSH 7400, Issue 2	For PCM: NIOSH 7400, “A” rules	For PCM: Count until 100 fibers are detected. Count a minimum of 20 FOVs. Stop at 100 FOVs regardless of count.	For PCM: LB-000015
D	Outdoor ABS Samples (ATV, and mowing and roto-milling equipment), Perimeter Air Samples (includes field duplicates)	Yes	Yes – for high flow sample if both high and low flow samples overloaded (>25%) or unevenly loaded	No	Yes	TEM – ISO 10312	All asbestos $L \geq 0.5\mu\text{m}$ AR $\geq 3:1$	Count until one is achieved: i) Target $S = 0.003 \text{ cc}^{-1}$ or ii) An area of 1.0 mm^2 of filter evaluated or iii) 25 LA found (finish GO where 25 th LA found). iv) For Chrysotile only: 50 found (finish GO where 50 th chrysotile found).	Current versions of: LB-000016, LB-000019, LB-000028, LB-000029, LB-000030, LB-000031, LB-000053, LB-000066, LB-000084, LB-000085
E	Ambient Air Samples (includes field duplicates)	Yes	Yes – if overloaded (>25%) or unevenly loaded material on filter	No	Yes	TEM – ISO 10312	All asbestos $L \geq 0.5\mu\text{m}$ AR $\geq 3:1$	Count until one is achieved: i) Target $S = 0.001 \text{ cc}^{-1}$ or ii) An area of 1.0 mm^2 of filter evaluated or iii) 25 LA found (finish GO where 25 th LA found). iv) For Chrysotile only: 50 found (finish GO where	Current versions of: LB-000016, LB-000019, LB-000028, LB-000029, LB-000030, LB-000031, LB-000053, LB-000066, LB-000084, LB-000085

Medium Code	Sample Type	Preparation Details				Analysis Details			Applicable Laboratory Modifications
		Investigative? (a)	Indirect Prep? (a,b)		Filter Archive ? (b)	Method(s)	Recording Rules	Analytical Sensitivity/ Prioritized Stopping Rules	
			With Ashing (b)	Without Ashing (b)					
								50 th chrysotile found).	

(a) See LB-000053 for additional details

(b) See most current version of EPA-LIBBY-08 for preparation details

TEM/PCM Preparation and Analytical Requirements for Field Quality Control Samples:

Medium Code	Sample Type	Preparation Details			Analysis Details			Applicable Laboratory Modifications
		Indirect Prep?		Filter Archive?	Method	Recording Rules	Analytical Sensitivity/Prioritized Stopping Rules	
		With Ashing	Without Ashing					
F	Lot blanks and field blanks	No	No	Yes	PCM – NIOSH 7400, Issue 2	For PCM: NIOSH 7400, “A” rules	For PCM: Count until 100 fibers are detected. Count a minimum of 20 FOVs. Stop at 100 FOVs regardless of count.	For PCM: LB-000015
G	Lot blanks and field blanks	No	No	Yes	TEM – ISO 10312	All asbestos $L \geq 0.5\mu\text{m}$ $AR \geq 3:1$	Examine an area of 0.1 mm ² of filter	Current versions of: LB-000016, LB-000019, LB-000028, LB-000029, LB-000030, LB-000031, LB-000053, LB-000066, LB-000084, LB-000085

(a) See LB-000053 for additional details

(b) See most current version of EPA-LIBBY-08 for preparation details

QAPP Worksheet #12
SAP Analytical Summary # OU8ABS0710
Summary of Preparation and Analytical Requirements for Asbestos
(continued)

Laboratory QC Sample Frequencies:

TEM: Lab Blank – 4%
Recount Same – 1%
Recount Different – 2.5%
Verified Analysis – 1%
Repreparation – 1%

Requirements Revision:

Revision #:	Effective Date:	Revision Description
0	07/15/10	N/A

Analytical Laboratory Review Sign-off:

- ☐ EMSL – Libby [sign & date: _____]
- ☐ EMSL – Cinnaminson [sign & date: _____]
- ☐ EMSL – Beltsville [sign & date: _____]
- ☐ EMSL – Centennial [sign & date: _____]
- ☐ ESAT [sign & date: _____]
- ☐ Hygeia [sign & date: _____]
- ☐ RESI [sign & date: _____]

[Checking the box and initialing above indicates that the laboratory has reviewed and acknowledged the preparation and analytical requirements associated with the specified SAP.]

**QAPP Worksheet #13
Secondary Data Criteria and Limitations Table**

Secondary Data	Data Source (Originating Organization, Report Title, and Date)	Data Generator(s) (Originating Org., Data Types, Data Generation/ Collection Dates)	How Data Will Be Used	Limitations on Data Use
EPA Document No. 1073923-R8 SDMS	Letter written to MDOT titled: Report of Findings Sampled Worker Air Space During Routine Maintenance Activities Libby, MT MDOT Task Order No. 605; TetraTech No. 1156561296	Written by: TetraTech, Inc. 303 Irene Street Helena, MT 59601 Dated: July 19, 2007	Data will be used during the activity based and soil sampling along Hwy. 37 and Hwy. 2 to determine where samples should be collected.	Sampling was not performed throughout all of OU8

QAPP Worksheet #14 Summary of Project Tasks

Sampling Tasks:

Soil Samples Soil samples will be collected along both sides of selected ROWs from the following roadways in OU8: Highway 37 from Rainy Creek Road to the dam, Highway 2, Highway 260, Highway 482, and Highway 567. One soil aliquot will be collected for every 100 ft of ROW. A person trained to visually detect vermiculite in soil in the field will mark areas where vermiculite is detected using spray paint, flags, or other markers. The aliquots will be pulled from these areas marked for visible vermiculite. A composite sample will be created out of ten aliquots; therefore, one composite sample will be created for every 1,000 ft of ROW. The volume of soil required for each aliquot should be approximately 100 g in order to make a composite sample of approximately one kg. Multiple field crews may be deployed to collect soil samples in order ensure soil samples are submitted for processing and analysis as quickly as possible and results are received prior to the start of AMS sampling. All soil samples will be collected in 4-mil poly bags. A total of approximately 250 composite samples will be created.

ABS Samples ABS samples will be collected from approximately six locations along the above listed highways pending the results of the soil samples. Samples will be collected using a minimum of two ATVs at each location (one rider followed by at least one other rider). ATV riders will each be equipped with a low-flow (2-3 L/min) personal air sampler. Air cassettes will be changed at a set time determined on-site by the field crew. A minimum of 12 ABS air samples will be collected. MDEQ is also expected to mow areas along Highway 37. One high flow (10 L/min) and one low flow (2-3 L/min) air sampler will be set up daily on each mower during the duration of the mowing activities, and air sample cassettes will be changed every two hours or as determined on-site by the field crew. Representative soil samples will also be collected from each mowing area prior to the start of mowing activities. The exact number of air and soil samples collected during mowing activities will be determined on-site by the field crew.

Rotomilling Samples Ambient air sampling stations will remain in place at locations away from the immediate rotomilling activities and used daily until all sidewalks and roads are resurfaced. Each ambient air sample will be collected over an 8 to 12-hour period at a set high flow rate of 10 L/min using mixed cellulose ester (MCE) filter cassettes for a total volume of between 4,800 and 6,000 L. Perimeter air samples will be collected along the perimeter of the rotomilling activity, at both upwind and downwind locations. These locations will be determined and adjusted daily depending on wind direction and other weather-related events, traffic patterns, and the duration of each rotomilling activity. ABS samples will also be collected directly from the rotomilling equipment. At each determined perimeter air sample location, including the rotomilling equipment, samplers will be set up for both high flow and low flow rates, and the cassettes will be changed every two hours, or at a set time determined on-site by the field crew. Low flow samples will be collected at a set flow rate of 2-3 L/min using MCE filter cassettes for an approximate total volume of 240 to 360 L. High flow samples will be collected at a set flow rate of 10L/min using MCE filter cassettes for an approximate total volume of 1,200 L. All perimeter air samples will be collected at breathing height, approximately four to five feet above the ground surface. A minimum of eight ambient air samples and 40 perimeter air samples will be collected each day for the duration of the rotomilling project.

Note that ERT/SERAS is responsible for supplying all field sampling equipment, ATVs, and appropriate PPE. All sample locations must be recorded on-site using a GPS unit.

QAPP Worksheet #14
Summary of Project Tasks
(continued)

Analysis Tasks: EMSL/Libby, an on-site laboratory subcontracted by ESAT, will be used for rapid-turn analysis of all soil samples by PLM NIOSH Method 9002, and all ABS and perimeter air samples by PCM NIOSH Method 7400. EMSL, or another ESAT-designated laboratory, will be used for the analysis of all other air samples by PCM NIOSH Method 7400. ESAT, EMSL, or another ESAT-designated laboratory, will be used for the analysis of air samples by TEM ISO Methods 10312 or 13794. All air samples will be taken to the on-site EMSL laboratory initially to determine particulate loading of the MCE filter cassettes. The flow rates of the air samplers may be adjusted by the field crew based on this initial filter inspection by EMSL. ESAT, EMSL, or another ESAT-designated laboratory may also be used for the analysis of soil samples by EPA Method 600/R-93/116, as requested by the EPA PO.

Quality Control Tasks: Field duplicate soil samples will be collected at a rate of one duplicate sample per 20 soil samples collected. Soil sample field blanks will be collected at a rate of one field blank sample per 20 soil samples collected. Blank sand to be used as field blank sample material will be provided by the soil prep facility in Troy, Montana. One lot blank will be analyzed for each new lot of MCE filter cassettes. One field blank will be collected and submitted for analysis for each day of sampling for the duration of the ABS and rotomilling activities. Four perimeter field duplicates will be collected and analyzed for each day of sampling (two collected at the high flow rate and two at the low flow rate; perimeter field duplicates will be collected in the same manner as the high or low flow rate samples collected during the rotomilling activities). One ambient air field duplicate will be collected over an 8-hour period at the high flow rate and analyzed each day for the duration of the rotomilling project.

Secondary Data: N/A

Data Management Tasks: All sampling location identification (ID) numbers will be given to ERT by ESAT prior to the sampling event. Field sampling data will be recorded for each sample collected by ERT personnel on a sample log sheet (provided by CDM) and loaded into the Scribe database. All samples and copies of sample log sheets will be delivered to the EMSL/Libby laboratory. ERT/SERAS is responsible for generating all chain of custody (COC) forms prior to delivery of the samples to the laboratory. Deliverables will be generated according to appropriate SERAS, ESAT or EMSL SOPs. Modes of delivery include electronic delivery of all related documents and data upload into the Scribe Database.

Documentation and Records: All documentation will be recorded in accordance with all the Project SOPs listed in Worksheet #21

Assessment/Audit Tasks: No performance audit of field operations is anticipated for this project. The tasks associated with this SAP/QAPP are assessed using peer reviews and management system reviews. Peer review enables the field team to identify and correct recording errors before sample log sheets are submitted. Peer review enables the analytical team to identify and correct reporting errors before Data Reports are delivered. Management system reviews establish compliance with prevailing management structure, policies and procedures, and ensures that the required data are obtained.

Data Review Tasks: Analytical data will be validated in accordance with EDD requirements. All project deliverables will receive an internal peer review prior to release, per guidelines established in the SERAS and/or ESAT Quality Management Plan (QMP), or related document.

QAPP Worksheet #15
Reference Limits and Evaluation Table

Matrix: Soil

Analytical Group: Asbestos (PLM)

Concentration Level: Low

Analyte	CAS Number	Project Action Limit (applicable units)	Project Quantitation Limit (applicable units)	Analytical Method		Achievable Laboratory Limits	
				MDLs	Method QLs	MDLs	QLs
Asbestos (LA, other amphibole asbestos, and chrysotile asbestos)	1332-21-4 (amphibole asbestos)	0.1% LA by mass fraction (MF)	Bin A = Non Detect (ND)	0.1% LAMF	N/A	Bin A = Non Detect (ND)	Bin A = Non Detect (ND)
	12001-29-5 (chrysotile asbestos)	1.0% other amphibole and chrysotile asbestos	Bin B1 = <0.2% LAMF			Bin B1 = <0.2% LAMF	Bin B1 = <0.2% LAMF
			Bin B2 = 0.2% to <1.0% LAMF			Bin B2 = 0.2% to <1.0% LAMF	Bin B2 = 0.2% to <1.0% LAMF
			Bin C = 1.0% LAMF or >1.0% LA by area fraction (AF)			Bin C = 1.0% LAMF or >1.0% LA by area fraction (AF)	Bin C = 1.0% LAMF or >1.0% LA by area fraction (AF)
			<1.0% or a whole number percent for other amphibole and chrysotile asbestos			<1.0% or a whole number percent for other amphibole and chrysotile asbestos	<1.0% or a whole number percent for other amphibole and chrysotile asbestos

QAPP Worksheet #15
Reference Limits and Evaluation Table
(continued)

Matrix: Air

Analytical Group: Asbestos (PCM analysis with additional TEM confirmation)

Concentration Level: Low

Analyte	CAS Number	Project Action Limit (applicable units)	Project Quantitation Limit (applicable units)	Analytical Method		Achievable Laboratory Limits	
				MDLs	Method QLs	MDLs	QLs
Asbestos (LA, other amphibole asbestos, and chrysotile asbestos)	1332-21-4 (amphibole asbestos) 12001-29-5 (chrysotile asbestos)	0.1 asbestos fibers (>5 μ m long)/cc; 1 f/cc/30 min excursion	7 fibers/mm ² (relates to 0.0006 f/cc for 4,800L collected over an 8-hour period for high flow ambient air samples, 0.0022 f/cc for 1,200L collected over a 2-hour period for high flow perimeter samples, or 0.009 f/cc for 240 to 360L collected over a 2-hour period for low flow perimeter samples)	7 fibers/mm ²	N/A	7 fibers/mm ² (relates to 0.0006 f/cc for 4,800L collected over an 8-hour period for high flow ambient air samples, 0.0022 f/cc for 1,200L collected over a 2-hour period for high flow perimeter samples, or 0.009 f/cc for 240 to 360L collected over a 2-hour period for low flow perimeter samples)	7 fibers/mm ² (relates to 0.0006 f/cc for 4,800L collected over an 8-hour period for high flow ambient air samples, 0.0022 f/cc for 1,200L collected over a 2-hour period for high flow perimeter samples, or 0.009 f/cc for 240 to 360L collected over a 2-hour period for low flow perimeter samples)

μ m = micron

f/cc = fibers per cubic centimeter

mm² = millimeter squared

QAPP Worksheet #16
Project Schedule Timeline Table

Activities	Organization	Dates (MM/DD/YY)		Deliverable	Deliverable Due Date
		Anticipated Date(s) of Initiation	Anticipated Date of Completion		
Field Activities	ERT/SERAS	July 20, 2010	To Be Determined (each project is estimated to take a total of 2-3 weeks to complete)	Sample log sheets (includes upload to the Scribe database)	DataRAM and MET data will be posted to a secure internet site daily
Data Validation	ESAT	August 2010	To Be Determined	Analytical Data Report (includes upload to the Scribe database)	Rapid turn-around time upon sample delivery to the EMSL/Libby laboratory

QAPP Worksheet #17
Sampling Design and Rationale

Describe and provide a rationale for choosing the sampling approach (e.g., grid system, biased statistical approach): Soil and ABS samples will be collected along both sides of selected ROWs from the following roadways in OU8: Highway 37 from Rainy Creek Road to the dam, Highway 2, Highway 260, Highway 482, and Highway 567. All sample locations will be judgmental based on visual inspection of the area for vermiculite and the specific schedule of lawn mowing activities along Highway 37. Soil samples will be collected to determine the best locations of the ABS samples. ABS samples will be collected to determine if airborne dust generated from routine maintenance activities is contaminated with LA, other amphibole asbestos, or chrysotile asbestos, and therefore, posing an exposure risk to persons performing the maintenance work and the residents of Libby. Attachment A identifies the five highway segments located in OU8.

The MDOT rotomilling and asphalt work will take place on Highway 37 between Highway 2 and the bridge over the Kootenai River in Libby. All sample locations will be judgmental based on daily rotomilling activities, visual inspection of the work area, and MET data. Perimeter and ABS samples will be collected to determine if airborne dust generated from the rotomilling activities is contaminated with LA, other amphibole asbestos, or chrysotile asbestos, and therefore, posing an exposure risk to persons performing the rotomilling work and the residents of Libby. Ambient air samples will be collected to determine the concentration of asbestos in ambient air during the rotomilling project. Ambient air samplers will be placed in areas that are open or on top of buildings with rooflines above surrounding buildings, and where access to the properties is likely to be granted. Ambient air sampler locations will spatially cover the section of Highway 37 where rotomilling work will be performed. Eight ambient air samplers will be set up along Highway 37 between Highway 2 and bridge over the Kootenai River, and two ambient air samplers will be set up at locations across the river. Attachment B identifies properties along Highway 37 where it is likely that ambient air samplers can be set up anywhere on the property.

QAPP Worksheet #17
Sampling Design and Rationale
(continued)

Describe the sampling design and rationale in terms of what matrices will be sampled, what analytical groups will be analyzed and at what concentration levels, the sampling locations (including QC, critical, and background samples), the number of samples to be taken, and the sampling frequency (including seasonal considerations) [May refer to map or Worksheet #18 for details]: One soil aliquot will be collected for every 100 ft of ROW along the five highway segments. The aliquots will be pulled from areas marked for visible vermiculite. A composite sample will be created out of ten aliquots; therefore, one composite sample will be created for every 1,000 ft of ROW. The volume of soil required for each aliquot should be approximately 100 g in order to make a composite sample of approximately one kg. A total of approximately 250 composite samples will be created.

ABS samples will be collected from approximately six locations along the highways pending the results of the soil samples. Samples will be collected using ATVs at each location. ATV riders will be equipped with low-flow personal air samplers with cassettes that will be changed at a set time determined on-site by the field crew. A minimum of 12 ABS air samples will be collected. MDEQ is also expected to mow areas along Highway 37. One high flow and one low flow air sampler will be set up daily on each mower during the duration of the mowing activities, and air sample cassettes will be changed every two hours or as determined on-site by the field crew. Representative soil samples will also be collected from each mowing area prior to the start of mowing activities. The exact number of air and soil samples collected during mowing activities will be determined on-site by the field crew. Field duplicate soil samples will be collected at a rate of one duplicate sample per 20 soil samples collected. Soil sample field blanks will be collected at a rate of one field blank sample per 20 soil samples collected. Blank sand to be used as field blank sample material will be provided by the soil prep facility in Troy, Montana.

A minimum of ten perimeter air samplers (five high flow and five low flow) will be set up daily, which includes one high flow and one low flow sampler on the rotomilling equipment. Perimeter air sample cassettes will be changed every two hours or as determined on-site by the field crew. Therefore, approximately 40 perimeter air samples will be collected per day of rotomilling activities. A minimum of eight to ten ambient air samplers will be set up each day during the duration of the rotomilling project. All ambient air samplers will be set at a high flow rate for an 8 to 12-hour period. Therefore, one ambient air sample per day will be collected at each sampler station for a minimum total of eight samples collected per day. Four perimeter field duplicates will be collected and analyzed for each day of sampling (two collected at the high flow rate and two at the low flow rate; perimeter field duplicates will be collected in the same manner as the high or low flow rate samples collected during the rotomilling activities). One ambient air field duplicate will be collected over an 8-hour period at the high flow rate and analyzed each day for the duration of the rotomilling project. One lot blank will be analyzed for each new lot of MCE filter cassettes. One field blank will be collected and submitted for analysis for each day of sampling for the duration of the ABS and rotomilling activities.

QAPP Worksheet #18
Sampling Locations and Methods/SOP Requirements Table

Sampling Location	Matrix	Height	Analytical Group	Concentration Level	Number of Samples (identify field duplicates)	Sampling SOP Reference	Rationale for Sampling Location
Locations of soil samples to be determined on-site based on visible vermiculite inspection.	Soil	N/A	Asbestos by PLM	Low	Approximately 250 plus field duplicates and field blanks collected at a rate of 1 per 20 samples	SERAS SOP #2015, <i>Field Sampling for Air Asbestos</i>	Judgmental
Locations of ABS samples to be determined on-site based on soil sample results.	Air	Breathing height or breathing zone	Asbestos by PCM/TEM		Minimum of 12		
Locations of perimeter air samplers to be determined daily on-site					Minimum 40 perimeter samples per day		
Properties identified for ambient air samplers (see Attachment A):					Minimum 8 ambient air samples per day		
1. Legion Ballfield (top of building)					1 Field blank per day		
2. Asa Woods School (near front door on/at roof)					4 perimeter field duplicates per day		
3. Field at CARD Clinic (vacant lot next to clinic)					1 ambient air field duplicate per day		
4. Community Center (near front door)					1 lot blank for each new lot of MCE cassettes		
5. United Methodist Church (parking lot)							
6. County Courthouse (west or south side of roof)							
7. Down Under Motel (west end of highway work)							
8. BNSF Park (the Gut; downslope from bridge)							
9. Dream Marine (east end of highway work)							
10. Near Bridge Trail (right-of-way near bridge, possibly the Parker property)							

QAPP Worksheet #19
Analytical SOP Requirements Table

Matrix	Analytical Group	Concentration Level	Analytical and Preparation Method¹	Sample Volume	Containers (number, size, and type)	Preservation Requirements (chemical, temperature, light protected)	Maximum Holding Time (preparation/analysis)
Soil	Asbestos by PLM	Low	NIOSH Method 9002	Up to 1 kg	1 4-mil poly bag	None	N/A
Soil	Asbestos by PLM	Low	EPA Method 600/R-93/116	Up to 1 kg	1 4-mil poly bag	None	N/A
Air	Asbestos by PCM	Low	NIOSH Method 7400	240L to 1,200L (perimeter and ABS samples) 4,800L (ambient air samples)	1-0.8µm MCE filter cassette per sample	None	N/A
Air	Asbestos by TEM	Low	TEM-ISO Method 10312 (Direct Prep) TEM-ISO Method 13794 (Indirect Prep for overloaded filters)	240L to 1,200L (perimeter and ABS samples) 4,800L (ambient air samples)	1-0.8µm MCE filter cassette per sample	None	N/A

¹Specify the appropriate reference letter or number from the Analytical SOP References table (Worksheet #23).

QAPP Worksheet #20
Field Quality Control Sample Summary Table

Matrix	Analytical Group	Concentration Level	Analytical and Preparation Method¹	No. of Sampling Locations	No. of Field Duplicate Pairs	No. of Field Blanks	No. of Equip. Blanks	No. of PT Samples	Total No. of Samples to Lab
Soil	Asbestos by PLM	Low	NIOSH Method 9002 EPA Method 600/R-93/116	1 soil aliquot for every 100 ft	1 per 20 soil samples	1 per 20 soil samples	1 prep blank per 20 soil samples (EPA Method only)	N/A	Approx. 275
ABS Air, ATVs and mowers	Asbestos by PCM/TEM	Low	PCM NIOSH Method 7400 TEM-ISO Method 10312 (Direct Prep) TEM-ISO Method 13794 (Indirect Prep for overloaded filters)	Minimum 6	Minimum 1 per day	1 per day	N/A	N/A	To be determined on-site
Ambient Air, high flow rate	Asbestos by PCM/TEM	Low	PCM NIOSH Method 7400 TEM-ISO Method 10312 (Direct Prep) TEM-ISO Method 13794 (Indirect Prep for overloaded filters)	Minimum 8 per day	1 per day	1 per day	N/A	N/A	Minimum 10 per day

QAPP Worksheet #20
Field Quality Control Sample Summary Table
 (continued)

Perimeter Air, high flow rate	Asbestos by PCM/TEM	Low	PCM NIOSH Method 7400 TEM-ISO Method 10312 (Direct Prep) TEM-ISO Method 13794 (Indirect Prep for overloaded filters)	Minimum 20 per day	2 per day	No additional	N/A	N/A	Minimum 22 per day
Perimeter Air, low flow rate	Asbestos by PCM/TEM	Low	PCM NIOSH Method 7400 TEM-ISO Method 10312 (Direct Prep) TEM-ISO Method 13794 (Indirect Prep for overloaded filters)	Minimum 20 per day	2 per day	No additional	N/A	N/A	Minimum 22 per day

¹Specify the appropriate reference letter or number from the Analytical SOP References table (Worksheet #23).

QAPP Worksheet #21
Project Sampling SOP References Table

Reference Number	Title, Revision Date and/or Number	Originating Organization	Equipment Type	Modified for Project Work? (Yes/No)	Comments
2129	Met One Remote Meteorological Station	SERAS	Portable 3-meter tower	No	
2015	Field Sampling for Air Asbestos	SERAS	0.8 μ m MCE filter cassettes Field data sheets	No	
4001	Logbook Documentation	SERAS	Appropriate logbooks	No	
2004	Sample Packaging and Shipment	SERAS	N/A	No	
2005	Quality Assurance/Quality Control Samples	SERAS	N/A	No	
4005	Chain of Custody Procedures	SERAS	N/A	No	
2002	Sample Documentation	SERAS	Field data sheets Chain of Custody forms Sample labels	No	

QAPP Worksheet #22
Field Equipment Calibration, Maintenance, Testing, and Inspection Table

Field Equipment	Calibration Activity	Maintenance Activity	Testing Activity	Inspection Activity	Frequency	Acceptance Criteria	Corrective Action	Responsible Person	SOP Reference ¹
Low flow, battery-powered air sampling pumps with rotameter and tygon tubing	Adjust flow rate	Charge battery	Check flow	Check keypad, flow meter working, LCD screen working	Daily, as needed	N/A	Adjust flow rate	Field personnel	Manufacturer's Operating Guide; SERAS SOP #2015
High flow, battery-powered air sampling pumps with rotameter and tygon tubing	Adjust flow rate	Charge battery	Check flow	Check keypad, flow meter working, LCD screen working	Daily, as needed	N/A	Adjust flow rate	Field personnel	Manufacturer's Operating Guide; SERAS SOP #2015
DataRAM 4™	Zero	Charge battery	Check flow	Check keypad	Daily, as needed	Pass zero initialization	Clean optics, send to manufacturer for repairs	Field personnel	Manufacturer's Operating Guide; SERAS SOP #2015
Portable 3-Meter Tower		Charge battery			Daily, as needed	N/A		Field personnel	Manufacturer's Operating Guide; SERAS SOP #2129
GPS unit		Charge battery			Daily, as needed	N/A		Field personnel	Manufacturer's Operating Guide

¹Specify the appropriate reference letter or number from the Project Sampling SOP References table (Worksheet #21).

QAPP Worksheet #23
Analytical SOP References Table

Reference Number	Title, Revision Date, and/or Number	Definitive or Screening Data	Analytical Group	Instrument	Organization Performing Analysis	Modified for Project Work? (Yes/No)
NIOSH 9002	Asbestos (bulk) by PLM	Definitive	Asbestos	Stereomicroscope, PLM	EMSL/Libby on-site laboratory (ESAT subcontract laboratory)	No
SRC-LIBBY-01 (Rev. 2)	Bulk Asbestos Analysis by Stereomicroscopy and PLM	Definitive	Asbestos	Stereomicroscope, PLM	EMSL/Libby on-site laboratory (ESAT subcontract laboratory)	No
SRC-LIBBY-03 (Rev. 2)	Analysis of Asbestos Fibers in Soil by PLM	Definitive	Asbestos	Stereomicroscope, PLM	EMSL/Libby on-site laboratory (ESAT subcontract laboratory)	No
NIOSH 7400	Asbestos and Other Fibers by PCM (R13.2 2009 11 13)	Definitive	Asbestos	PCM	EMSL/Libby on-site laboratory (ESAT subcontract laboratory)	No
ISO 10312	Determination of Asbestos Fibers by Direct Transfer Transmission Electron Microscopy	Definitive	Asbestos	TEM	EMSL/Libby on-site laboratory (ESAT subcontract laboratory)	No
ISO 13794	Determination of Asbestos Fibers by Indirect Transfer Transmission Electron Microscopy	Definitive	Asbestos	TEM	EMSL/Libby on-site laboratory (ESAT subcontract laboratory)	No
TEM-01.00	Asbestos Analysis by Transmission Electron Microscopy	Definitive	Asbestos	TEM	ESAT	No

QAPP Worksheet #24
Analytical Instrument Calibration Table

Instrument	Calibration Procedure	Frequency of Calibration	Acceptance Criteria	Corrective Action (CA)	Person Responsible for CA	SOP Reference¹
Stereomicroscope	Microscope Alignment	Daily	Within manufacturer's guidelines	Determine cause of error, re-align	Laboratory Analyst	SRC-LIBBY-01 (Rev. 2) SRC-LIBBY-03 (Rev. 2)
PLM	Microscope Alignment	Daily	Within manufacturer's guidelines	Determine cause of error, re-align	Laboratory Analyst	SRC-LIBBY-01 (Rev. 2) SRC-LIBBY-03 (Rev. 2)
PCM	Microscope Alignment	Daily	Within manufacturer's guidelines	Determine cause of error, re-align	Laboratory Analyst	R13.2 2009 11 13
PCM	Phase Shift	Weekly	Within manufacturer's guidelines	Determine cause of error, re-check	Laboratory Analyst	R13.2 2009 11 13
PCM	Resolution	Daily	Within manufacturer's guidelines	Determine cause of error, re-check	Laboratory Analyst	R13.2 2009 11 13
TEM	Screen Magnification	Within laboratory's SOP requirement	Within manufacturer's guidelines	Determine cause of error, re-check	Laboratory Analyst	TEM-ISO 10312 TEM-ISO 13794 TEM-01.00
TEM	Spot Size	Within laboratory's SOP requirement	Within manufacturer's guidelines	Determine cause of error, re-check	Laboratory Analyst	TEM-ISO 10312 TEM-ISO 13794 TEM-01.00
TEM	Energy Calibration Check	Within laboratory's SOP requirement	Within manufacturer's guidelines	Determine cause of error, re-check	Laboratory Analyst	TEM-ISO 10312 TEM-ISO 13794 TEM-01.00
TEM	Detector Resolution Check	Within laboratory's SOP requirement	Within manufacturer's guidelines	Determine cause of error, re-check	Laboratory Analyst	TEM-ISO 10312 TEM-ISO 13794 TEM-01.00
TEM	K-Factor Determination	Within laboratory's SOP requirement	Within manufacturer's guidelines	Determine cause of error, re-check	Laboratory Analyst	TEM-ISO 10312 TEM-ISO 13794 TEM-01.00

¹Specify the appropriate reference letter or number from the Analytical SOP References table (Worksheet #23).

QAPP Worksheet #25
Analytical Instrument and Equipment Maintenance, Testing, and Inspection Table

X Worksheet Not Applicable: Responsibility lies within the contracted laboratory.

Instrument/ Equipment	Maintenance Activity	Testing Activity	Inspection Activity	Frequency	Acceptance Criteria	Corrective Action	Responsible Person	SOP Reference¹

¹Specify the appropriate reference letter or number from Analytical SOP References table (Worksheet #23).

QAPP Worksheet #26
Sample Handling System

SAMPLE COLLECTION, PACKAGING, AND SHIPMENT
Sample Collection (Personnel/Organization): ERT/SERAS Field personnel
Sample Packaging (Personnel/Organization): Sample Coordinator/ESAT
Coordination of Shipment (Personnel/Organization): Sample Coordinator/ESAT
Type of Shipment/Carrier: Personal delivery to EMSL/Libby laboratory or FedEx to ESAT
SAMPLE RECEIPT AND ANALYSIS
Sample Receipt (Personnel/Organization): Laboratory Analyst/ESAT or subcontract laboratory determined by ESAT
Sample Custody and Storage (Personnel/Organization): Laboratory Analyst/ESAT or subcontract laboratory determined by ESAT
Sample Preparation (Personnel/Organization): Laboratory Analyst/ESAT or subcontract laboratory determined by ESAT
Sample Determinative Analysis (Personnel/Organization): Laboratory Analyst/ESAT or subcontract laboratory determined by ESAT
SAMPLE ARCHIVING
Field Sample Storage (No. of days from sample collection): Samples shipped to archive facility in Libby, MT
Sample Extract/Digestate Storage (No. of days from extraction/digestion): N/A
Biological Sample Storage (No. of days from sample collection): N/A
SAMPLE DISPOSAL
Personnel/Organization: Samples will not be disposed of
Number of Days from Analysis: N/A

QAPP Worksheet #27
Sample Custody Requirements

Field Sample Custody Procedures (sample collection, packaging, shipment, and delivery to laboratory): ERT/SERAS field personnel will be responsible for sample collection and delivery to the EMSL/Libby laboratory for initial sample inspection of air cassette filter loading and analysis. ERT/SERAS will be responsible for generating COC forms. The ESAT Sample Coordinator will be responsible for sample packaging and shipment to ESAT as necessary.

Laboratory Sample Custody Procedures (receipt of samples, archiving, disposal): EMSL/Libby and ESAT personnel will be responsible for sample receipt. ESAT will be responsible for sample archival. Samples will not be disposed of.

Sample Identification Procedures: The ESAT Data Manager will provide ERT/SERAS with a unique sample ID number for each sample. The sample ID numbers will be recorded on the COC forms by field personnel, and the samples, along with the original COC forms, will be relinquished to the analytical laboratory (or the sample prep facility in Troy, MT at the request of the EPA PO). Once the samples arrive at the analytical laboratory, the laboratory will assign samples associated with each COC form to a unique work order number. Samples associated with each work order number will then be assigned a unique laboratory sample ID number.

Chain of custody Procedures: SERAS SOP #4005

QAPP Worksheet #28
QC Samples Table

X Worksheet Not Applicable: Information provided in Worksheet #12

Matrix						
Analytical Group						
Concentration Level						
Sampling SOP						
Analytical Method/ SOP Reference						
Sampler's Name						
Field Sampling Organization						
Analytical Organization						
No. of Sample Locations						
QC Sample:	Frequency/Number	Method/SOP QC Acceptance Limits	Corrective Action	Person(s) Responsible for Corrective Action	Data Quality Indicator (DQI)	Measurement Performance Criteria

QAPP Worksheet #29
Project Documents and Records Table

Sample Collection Documents and Records	On-site Analysis Documents and Records	Off-site Analysis Documents and Records	Data Assessment Documents and Records	Other
Sample Log Sheets Field Modification documentation COC forms Sample labels Custody seals	Electronic DataRAM Data Electronic MET Data	Calibration Data Laboratory Results including QC Data	Data Validation Check Records	

QAPP Worksheet #30
Analytical Services Table

Matrix	Analytical Group	Concentration Level	Sample Location/ID Numbers	Analytical Method	Data Package Turnaround Time	Laboratory/Organization (Name and Address, Contact Person and Telephone Number)	Backup Laboratory/Organization (Name and Address, Contact Person and Telephone Number)
Soil	Asbestos by PLM	Low	To be determined (see Worksheet #17 and #18)	PLM NIOSH 9002 EPA 600/R-93/116	Rapid turnaround	EMSL/Libby: Ron Mahoney (406) 293-9066	ESAT: 16194 W. 45 th Drive Golden, CO 80403 Douglas Kent (303) 312-7725 Amy Christensen (303) 312-7724
Air	Asbestos by PCM/TEM	Low	To be determined (see Worksheet #17 and #18)	PCM NIOSH 7400 TEM-ISO 10312 TEM-ISO 13794	Rapid turnaround	EMSL/Libby: Ron Mahoney (406) 293-9066	ESAT: 16194 W. 45 th Drive Golden, CO 80403 Douglas Kent (303) 312-7725 Amy Christensen (303) 312-7724

Non Applicable- Task not performed.

QAPP Worksheet #31
Planned Project Assessments Table

Assessment Type	Frequency	Internal or External	Organization Performing Assessment	Person(s) Responsible for Performing Assessment (Title and Organizational Affiliation)	Person(s) Responsible for Responding to Assessment Findings (Title and Organizational Affiliation)	Person(s) Responsible for Identifying and Implementing Corrective Actions (CA) (Title and Organizational Affiliation)	Person(s) Responsible for Monitoring Effectiveness of CA (Title and Organizational Affiliation)
Readiness Review	One time	Internal					
Field Sampling Technical Systems Audit (TSA)	One time	Internal					

Non Applicable- Task not performed

QAPP Worksheet #32
Assessment Findings and Corrective Action Responses

Assessment Type	Nature of Deficiencies Documentation	Individual(s) Notified of Findings (Name, Title, Organization)	Timeframe of Notification	Nature of Corrective Action Response Documentation	Individual(s) Receiving Corrective Action Response (Name, Title, Org.)	Timeframe for Response
Readiness Review	Report or Memo stating deficiencies	Rebecca Thomas, EPA RPM	Immediately	Report or Memo stating Corrective Action Response	Rebecca Thomas, EPA RPM	Prior to July 20, 2010 or the start-up of sampling activities
Field Sampling TSA	Report or Memo stating deficiencies, field data sheets and logbooks, Field Modification documentation	Rebecca Thomas, EPA RPM	Immediately	Report or Memo stating Corrective Action Response, logbooks	Rebecca Thomas, EPA RPM	Prior to July 20, 2010 or the start-up of sampling activities

QAPP Worksheet #33
QA Management Reports Table

Type of Report	Frequency (daily, weekly monthly, quarterly, annually, etc.)	Projected Delivery Date(s)	Person(s) Responsible for Report Preparation (Title and Organizational Affiliation)	Report Recipient(s) (Title and Organizational Affiliation)
QA Summary Report	Once	Following the completion of the OU8 Activity-Based Outdoor Air Exposures project	ESAT Lead TEM Analyst	EPA RPM ESAT Team Manager
PLM Summary Report	Once	Following the completion of the OU8 Activity-Based Outdoor Air Exposures project	ESAT Lead TEM Analyst	EPA RPM ESAT Team Manager
TEM Summary Report	Once	Following the completion of the OU8 Activity-Based Outdoor Air Exposures project	ESAT Lead TEM Analyst	EPA RPM ESAT Team Manager
PCM Summary Report	Once	Following the completion of the OU8 Activity-Based Outdoor Air Exposures project	ESAT Lead TEM Analyst	EPA RPM ESAT Team Manager

QAPP Worksheet #34
Verification (Step I) Process Table

Verification Input	Description	Internal/ External	Responsible for Verification (Name, Organization)
Approval of QAPP	Confirmation that persons listed on Worksheet #1 have provided signatures	Int.	Nikki MacDonald, ESAT
COC forms	Reviewed for accuracy and completeness	Int.	ERT/SERAS, EMSL/Libby, and/or ESAT
Analytical Data Reports	Reviewed for accuracy and completeness	Int.	ESAT and EMSL/Libby

QAPP Worksheet #35
Validation (Steps IIa and IIb) Process Table

Step IIa/IIb	Validation Input	Description	Responsible for Validation (Name, Organization)
IIa	SOPs/Analytical Methods	Ensure that the sampling methods/procedures outlined in the SAP/QAPP are relevant to the Libby OU8 Activity-Based Outdoor Air Exposures project, that they were followed, and that any deviations were noted	EPA RPM ERT WAM
IIa	COC forms	Review COC forms and match with assigned sample ID numbers on the field data sheets and the sample cassettes, the requested analyses, and all other pertinent information	EMSL/Libby and/or ESAT Asbestos Analyst
IIa	Analytical Data Report	Review data reports against COC forms and handwritten analytical bench sheets, review Case Narrative, laboratory method deviations, Corrective Actions, instrument calibration reports, documentation of QC results	EMSL/Libby TEM Analyst ESAT Asbestos Analyst and/or other ESAT approved data reviewers (or asbestos analyst from ESAT subcontract laboratory)
IIb	Analytical Data Report	Quantify data based on QC deficiencies (precision, accuracy, % RSD, etc.)	EMSL/Libby TEM Analyst ESAT Lead TEM Analyst

QAPP Worksheet #36
Validation (Steps IIa and IIb) Summary Table

Step IIa/IIb	Matrix	Analytical Group	Concentration Level	Validation Criteria	Data Validator (title and organizational affiliation)
IIb	Soil	Asbestos by PLM	Low	EPA Requirements	Douglas Kent, ESAT Lead TEM Analyst or David Berry, EPA Toxicologist
IIb	Air	Asbestos by PCM/TEM	Low	EPA Requirements	Douglas Kent, ESAT Lead TEM Analyst or David Berry, EPA Toxicologist

QAPP Worksheet #37
Usability Assessment

X Worksheet Not Applicable: EPA Region VIII will be responsible for assessing the usability of the data.

Summarize the usability assessment process and all procedures, including interim steps and any statistics, equations, and computer algorithms that will be used:

Describe the evaluative procedures used to assess overall measurement error associated with the project:

Identify the personnel responsible for performing the usability assessment:

Describe the documentation that will be generated during usability assessment and how usability assessment results will be presented so that they identify trends, relationships (correlations), and anomalies:
